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Taxonomic and distributive notes on *Serapias lingua* subsp. *tunetana* (Orchidaceae), a rare endemic to Tunisia

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Abstract

Taxonomic and distributive notes on *Serapias lingua* subsp. *tunetana* (Orchidaceae), a rare endemic to Tunisia.— *Serapias lingua* subsp. *tunetana*, a rare endemic orchid confined to Tunis, northern of Tunisia, has been rediscovered far away from its type locality nearly after 22 years. Since its first finding in 1996 and its description published in 2005, the subspecies has not been found again, and was presumed to be extinct, or the taxon was erroneously identified. A detailed description of the subspecies justifying an amendment to its description, a map of its current distribution and colour photographs are also provided. The affinities to the related taxa within the *S. lingua* group occurring in Tunisia are here presented. The global IUCN status for this taxon is evaluated.

Key words: chorology, conservation, endemism, Orchidaceae, *Serapias*.

Resumen

Notas taxonómicas y distributivas sobre *Serapias lingua* subsp. *tunetana* (*Orchidaceae*), una rara espècie endémica de Túnez.— *Serapias lingua* subsp. *tunetana*, una rara orquídea endémica con área de distribución restringida en Túnez, al norte de Túnez, ha sido redescubierta lejos de su localidad tipo después de 22 años. Desde su primer hallazgo en 1996 y su descripción publicada en 2005, la subespecie no se había encontrado nuevamente y se presume que se extinguió o fue identificada erróneamente. En este trabajo se proporciona una descripción detallada de la subespecie que justifica una enmienda a su descripción, y se aporta asimismo un mapa de distribución y varias fotografías. Se listan las principales afinidades de la subsp. *tunetana* con los táxones más estrechamente relacionados dentro del grupo de *S. lingua* que se distribuyen en Túnez. Se evalúa su estado de conservación atendiendo a los criterios y categorías de la UICN.

Palabras clave: conservación, corología; endemismo, *Orchidaceae*, *Serapias*.

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INTRODUCTION

The genus *Serapias* L. (Orchidaceae) comprises about 26–30 species (Nelson, 1968; Baumann & Künkele, 1989; Baumann *et al.*, 2006; Delforge, 2016) with mainly Mediterranean distribution, although some species reach the west of the Atlantic coast. Its range extends from the Azores and the Canaries in the west to the Caucasus, and in the east and north as far as Brittany (France) (Gölz & Reinhard, 1980; Pérez Chiscano *et al.*, 1991; Delforge, 1995, 2016). In Tunisia, according to APD (2018) this genus includes six species: *S. cordigera* L., *S. lingua* L., *S. nurrica* Corrias, *S. parviflora* Parl., *S. stenopetala* Maire & T. Stephenson, and *S. strictiflora* Veiga. Within *Serapias lingua* it is possible to distinguish *S. lingua* subsp. *lingua*, a Mediterranean-Atlantic taxon, and *S. lingua* subsp. *tunetana* B. Baumann & H. Baumann, a taxon endemic to Tunisia, little known among botanists, very rare and not seen since 2000. From taxonomic and nomenclatural point of view, some authors (e.g. Le Floc'h *et al*., 2010; Véla *et al.*, 2012; Martin *et al.*, 2013, 2015) considered *S. lingua* subsp. *tunetana* as synonym of *S. strictiflora*.

The discovery of three localities where *S. lingua* subsp. *tunetana* grows allowed us to conduct taxonomic and distributive observations on this taxon. This contribution is part of the project of floristic investigation of Tunisia conducted by the authors in the last years (e.g. Domina *et al.*, 2015; El Mokni *et al.*, 2015*a*, *b*; Astuti *et al*., 2017).

MATERIALS AND METHODS

Systematic field excursions in the north of Tunisia were carried out in order to investigate taxonomy and distribution of taxa belonging to *Serapias lingua* gr. In Table 1 are presented the main morphological discriminant characters, and phenological and ecological traits between *Serpias lingua* subsp. *tunetana* and the taxonomic closest taxa occurring in Tunisia (*S. lingua* subsp. *lingua* and *S. strictiflora*). Characters of *S. lingua* subsp. *tunetana* were measured in the field; data of the other species result from literature (Lorenz, 2001; Baumann *et al.*, 2006; Venhuis *et al.*, 2007; Martin *et al.*, 2015; Delforge, 2016). In order to assess the IUCN status (IUCN, 2012) of this taxon the Extent of occurrence (EOO) and the Area of occupancy (AOO) were calculated using the GeoCAT tool according to Bachman *et al.* (2011) calculated with a 2 × 2 km cell fixed grid.

RESULTS AND DISCUSSION

The new findings were done on the course of botanical surveys in 2013 and 2014 in the north of Tunisia (Fig. 1). In 2013 the taxon was found in the Cap Bon peninsula, where some small, flowering individuals (Fig. 2) were recoded near the sea level, on Oligocene substrate within a loam-sandy depression of an acidic soil.

Figure 1. Distribution of *Serapias lingua* subsp. *tunetana* in Tunisia; the yellow dot indicates presumed locality discovered in 1996, whereas red dots indicate new discovered populations in the north of Tunisia, since April 2013.

In 2014 this taxon was discovered in the Kroumiria region where two populations were found in Tabarka on loam to clay-sandy depressions and in Ain Draham on clay-loamy depressions extending both on numidic substrate (Oligo-Eocene).

Description: Plants with 2–3 subglobose or ovoid tubercules. Stem straight and cylindrical, 100–200 mm high, green and often spotted red at the base; 3–5 basal leaves, linear-lanceolate, 40–110 mm long and 6–11 mm broad, and 1–2 bract-like cauline leaves; inflorescence lax, bearing 2–4 slender flowers; bracts ovate-lanceolate, grey to red with reddish veins, 38–52 mm long and 12–22 mm wide; sepals and petals form a pointed hood, which is normally (sub-) horizontally positioned; sepals ovate-lanceolate, 15–25 mm long, green to red colored with pinkish to purple veins; petals usually shorter than sepals, from a purple, orbicular

Figure 2. *Serapias lingua* subsp. *tunetana* from Cap Bon, northeastern Tunisia: (A), habitat and habit; (B), front view flower; (C), three-flowered inflorescence; (D), typical oval epichile (photographs: R. El Mokni, April 28, 2013).

base acuminate into a slender labellum by a constriction divided into hypochile and epichile; hypochile 8–13 mm long and 18–24(26) mm wide; lateral lobes inwardly replicated but still largely visible, purple with a red colored center; hypochile with a deeply grooved stigmatic surface; epichile lanceolate, 14–19(20) mm long and 8–11 mm in width [for Baumann & Baumann (2005) epichile measures only 4–7 mm —mean 5.4— in width and 7–10 mm —mean 8.7— long, see Table 1], red to dark red with very short yellowish to reddish hairs; ovary cylindrical, 18–24 mm (see Table 1).

Table 1. Main morphological characters, phenological and ecological traits of *Serapias lingua* subsp. *tunetana* and the two most closely related taxa occurring in Tunisia.

Taxon	***S. lingua* subsp. *tunetana***	***S. lingua* subsp. *lingua***	***S. strictiflora***
Number of flowers	2–3	2–6	2–4
Lip (epichile) color	Red to dark-red	Red to wine red, but also bright to whitish	Dark-red to purple-black
Epichile length (mm)	14–19(20)	8–14(18)	14–18(22)
Epichile width (mm)	8–11	7–8(10)	4–6
Epichile shape	Ovate to ovate-lanceolate	Lanceolate	Narrowly lanceolate to narrowly triangular
Epichile indumentum at the base	Slightly hairy	Slightly hairy	Very hairy
Flowering period	March to May	May to June	May to June
Plant habitat	Clay-loamy depressions on rocky coastal area with sparse thermophilic vegetation	Mainly oak forest areas within clay-sandy depressions with ombrophilous vegetation or psammophilous coastal area with sparse thermophilous vegetation	Slow-drainage clay-loamy depressions with thermophilous or ombrophilous vegetation

Flowering & fruiting period: March–May.

Habitat: In Cap Bon, in slow-drainage clay-loamy depressions with thermophilous or ombrophilous vegetation, growing mainly with *Cicendia filiformis* (L.) Delarbre, *Filago lojaconoi* (Brullo) Greuter, *Hypochaeris achyrophorus* L., *Lotus hispidus* DC., *Paronychia echinulata* Chater, *Plantago bellardii* All., *Romulea ramiflora* Ten., *Rumex bucephalophorus* L. subsp. *bucephalophorus* and *Trachynia distachya* (L.) Link.

In Kroumiria, in slow-drainage clay-loamy depressions with hemi-ombrophilous vegetation, growing mainly with *Cyperus* sp. pl., *Stachys arvensis* (L.) L., *Geranium dissectum* L., *Silene laeta* (Aiton) Godr., *Trifolium subterraneum* L., *Lotus hispidus* DC., *L. palustris* Willd., or in sandy-clay dried depressions on prairial areas within ombrophilous vegetation, growing mainly with *Bellis annua* L., *Trifolium campestre* Schreb., *T. micranthum* Viv., *Lythrum hyssopifolia* L., *Trachynia distachya* (L.) Link.

Distribution: Endemic to North Tunisia: Cap Bon, West Nabeul, El Haouaria-Jbel Labiadh): 80–120 m a.s.l.; Kroumiria, East Tabarka, Ras-Rajel: 100–150 m a.s.l.; Ain Draham, Fej-Errih: 600–650 m a.s.l. (Fig. 1)

Specimens examined (new records): Tunisia: Nabeul: El Haouaria-Jbel Labiadh, 37° 02’ 42” N, 11° 04’ 12” E, 94 m, 28.IV.2013. *R. El Mokni & G. Domina s.n.* (PAL-Gr!). Jendouba: Tabarka-Ras Rajel, 36° 56’ 26” N, 08° 53’ 06” E, 137 m, 18.IV.2014, *R. El Mokni*. *s.n.* (Herb. Univ. Bizerta!); Ain Draham-Fej Errih, 36° 45’ 04” N, 08° 41’ 26” E, 607 m, 15.V.2014, *R. El Mokni*. *s.n.* (Herb. Univ. Bizerta!).

Conservation status: *Serapias lingua* subsp. *tunetana* is so far known only from one locality in Cap Bon and two in Kroumiria. All the populations were found on small areas of about 20 m^2 and represented by no more than a dozen of individuals each. According to Bachman *et al*. (2011) methodology there are: EOO = 1950 km^2 and AOO = 12 km^2. There is no detailed information available on population dynamics; however, due to its habitat, the population trend and the number of mature individuals can be considered stable.

The population in Cap Bon is located in an area near the sea, but future urban developments (i.e. construction of roads, buildings) could represent a potential threat to the population. The Red List category (IUCN, 2016) here proposed for this taxon is: EN (Endangered) using the Criteria (Global Assessment): B1ab(iii)+D.

The most important conservation measure that we suggest is the habitat conservation. The areas were the found populations grow could be protected at local level according to the system of plant micro-reserves adopted in East Spain (Laguna e*t al*., 2004).

Taxonomic notes: This taxon was described as *Serapias lingua* subsp. *tunetana* by Baumann & Baumann (2005) from Cap Bon Region. Two years later it was considered as a form, *S. lingua* f. *tunetana* by Delforge (2007). Then, it was included in the synonymy of *S. strictiflora*, or of S. *lingua* subsp. *duriaei* (Rchb.) Maire by Le Floc'h *et al*. (2010) and Martin *et al.* (2013, 2015).

Serapias lingua subsp. *tunetana*, in our opinion, differs from *S. lingua* subsp. *lingua* and *S. strictiflora* [= *S. lingua* subsp. *duriaei* (Batt.) Soó] mainly by the shape and size of the lip (see Table 1 and Figs. 2, 3 and 4). The difference in the size of the epichile included in the original description by Baumann & Baumann (2005; i.e. 7–10 × 4–7 mm) and that measured by us (14–19 × 8–11 mm) may due to the small number of observations made by the describing authors that accentuated the values measured on some individuals with smaller flowers, due to particularly dry years.

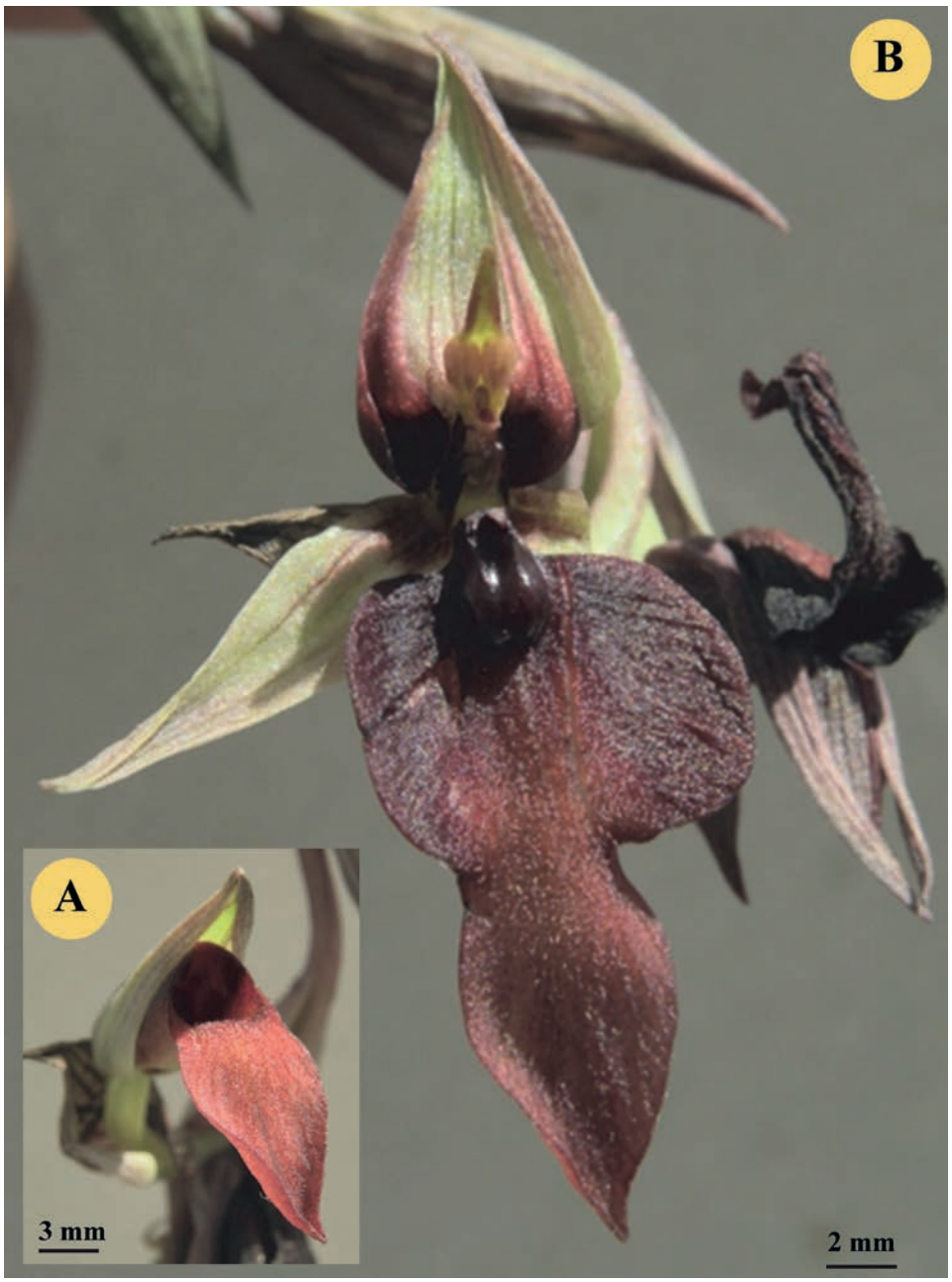

Figure 3. *Serapias lingua* subsp. *tunetana* from Kroumiria, northwestern Tunisia: (A), front view flower; (B), open flower with typical lanceolate epichile (photographs: R. El Mokni, May 15, 2014).

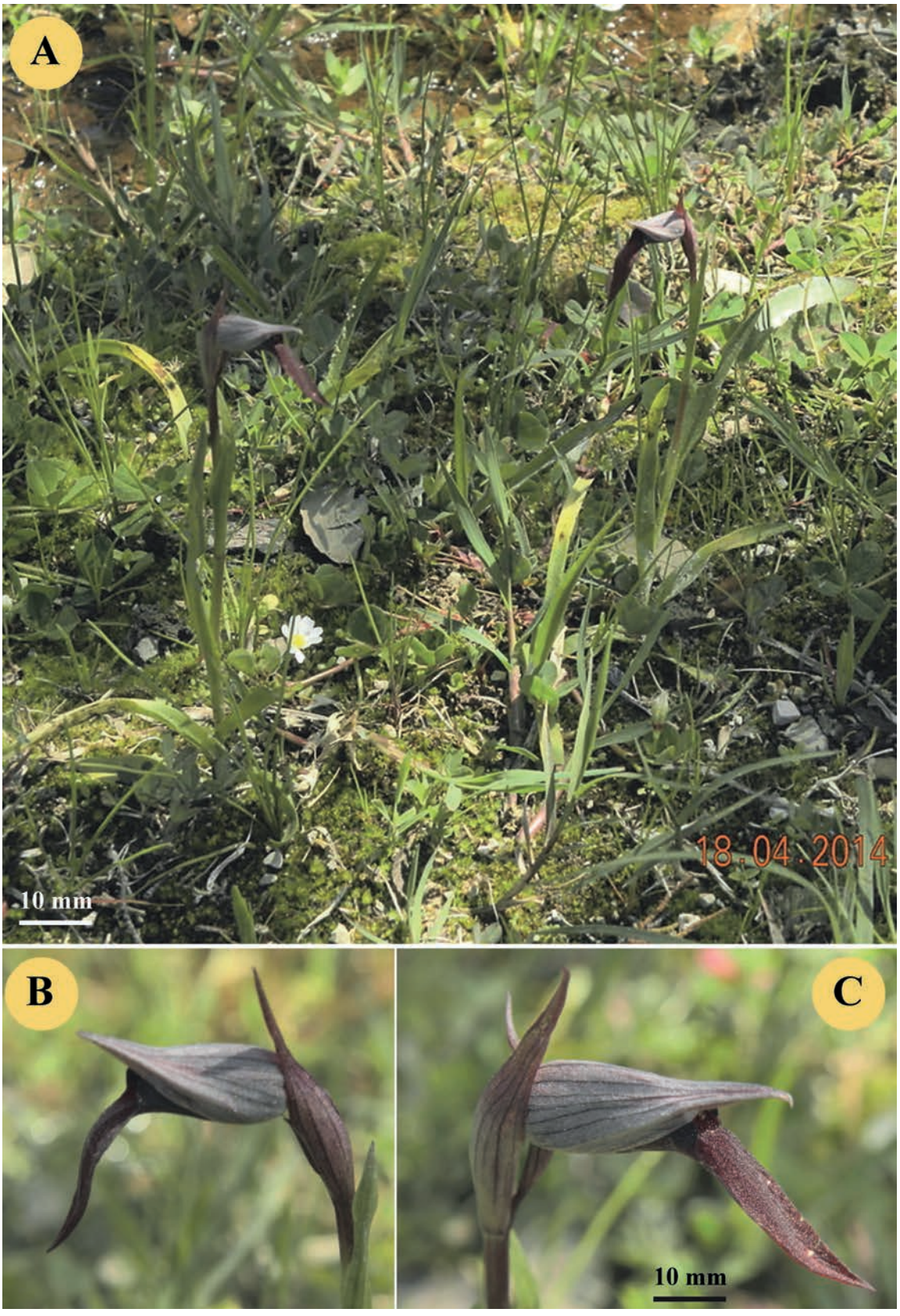

Figure 4. *Serapias lingua* subsp. *tunetana* from Kroumiria, northwestern Tunisia: (A), habitat and habit; (B), a profile view flower; (C), typical narrowly triangular epichile (photographs: R. El Mokni, April 18, 2014).

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